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SOME PRINCIPLES IN

DENTAL HEALTH EDUCATION.

Thesis presented as part of the
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I. INTRODUCTION.

In this thesis some of the literature of Health Education and dental health education will be reviewed and the application of health education principles to dental health problems examined.

The primary purpose of health education is to motivate the individuals to live healthfully and to adopt good health practices. To enable him to do this the individual must acquire knowledge and develop attitudes which are conducive to healthful living. He should have adequate and accurate knowledge concerning safety, nutrition, social and emotional health, preparation for family life and parenthood, factors influencing the maintenance of good health, prevention and control of disease and utilization of community resources (1).

Before health workers can expect people to adopt new health attitudes, they must themselves be prepared to modify many of their own ideas about working with people. Successful health education not only depends on an understanding of the basic concepts of human behaviour, but also on a knowledge of beliefs and attitudes people have towards certain fundamental problems. Beliefs about disease and its treatment are woven into the matrix of the social structure of every community. People show a great variation in their understanding about illness and the ways they have developed for handling it. They tend to cling to their beliefs and attitudes with an amazing tenacity.

Many of the elements in folk medicine are found in primitive concepts about disease. Variation in beliefs about disease are even found in societies where scientific medicine appears to be an accepted pattern. Health education therefore plays an important role in the community as a factor in promoting the physical, social and mental well being of the individual and the community.

II. HEALTH EDUCATION.

1. The need for health education.

While many people wish to be in good health they pay little or no attention to safeguard their health. In the struggle to combat disease the concept of early detection is of great importance. Health education now attempts to influence the public to submit every departure from normal to medical examination. This is attempted in programmes designed especially for early detection of cancer. One of the most important functions of the practising physician is that of health education. Unfortunately a lot of doctors are not aware of this function and they consider health education to be the responsibility of the public health authority. It is true, however, that health education, as the term is usually known, is a technique which requires a certain amount of knowledge, ability and training.

2. Attitudes, beliefs and knowledge of health.

Successful health education depends on the way members of the health education team are understood by the community. In this respect it is important to know the social and political structure of the community and the persons of power in key positions such as teachers and politicians.

The evaluation of a community reveals diverse attitudes beliefs and knowledge of health. A survey carried out by AitKen-Swan in 1954 in Manchester revealed that only 2% of those questioned knew the relationship between lung cancer and smoking (2).

A study on small pox vaccination done in Ching-liput District in India has shown that 38% of the respondents clearly believed that small pox can not be prevented. Only 11% knew about small pox vaccination while on the other hand among those who said small pox could be prevented, references were made to the belief that one had to satisfy the Goddess in

order to avoid small pox. Almost 38% of the respondents still believed that religious and magic ceremonies are able to cure small pox (2a).

On the other side is the realistic and practical attitude of a Moroccon woman who wants her husband to die because he has contracted tuberculosis. This attitude had been created through health education, but the knowledge however remained dissociated from overall views on modern treatment (3).

The patient's acceptance of services and his continued good will toward the doctor are based on more than professional skill and knowledge alone. They depend upon how well the doctor understands and particularly educates the patient to full co-operation. To achieve this attitude the physician must assess the patient's motives, feelings, wishes and previous experiences. The benefits that could be derived from better understanding between him and the patient have two aspects:

(i) more effective professional performance;

(ii) achievement of fuller potential health for the patient and his family.

The doctor needs to understand the patient and he must try to obtain an attitude of interest. When a physician finds that a patient is "unpleasant" it is often a sign that he does not understand the patient. Listening to the patient is an art and the doctor must not only listen for the meaning of the words spoken by the patient but he must strive to know what is left unsaid.

3. Socio-economic factors in health and health education.

The top of every community is formed by the well organised groups with a stable economy and a high standard of living. Adequate food, housing, clothing and emotional satisfaction are easily obtained. Since the water supply is abundant the disposal of waste and sewerage is satisfactory. Medical care is on a high standard, there are seldom serious outbreaks of epidemics. At the lower levels of the community however, live the people of whom the vast majority have a hard life.

Their economic status is low, the water supply is inadequate and the medical care is not as it should be. This part of the community is particularly large in urban areas in the cities in Asia, Africa and South America. For these people a large part of the day of the population is spent in food production and preparation. Provision of basic physical needs is barely sufficient. The task of relieving the distress of sudden physical disease and malnutrition makes impossible any programme of emotional, intellectual and social advancement. This is sometimes not yet fully realized. An overburden of poor growth due to malnutrition, a high incidence of disease related to a high birth rate often limits the result of a programme which is designed to promote the physical, intellectual and social well-being of the people. Many programmes of health education are set up to improve the health of the community and the young generation and diet patterns are designed for locally available foods but even then a lot of the items are beyond the family budget of the average household. Hence teaching about diet should aim to improve the food intake but it must be born in mind that the recommended quantities should have a close relationship with the purchasing power of the average family (4).

4. Family-centred health education.

The family is the primary unit of society and hence the basic unit of health education. The objective of family centred health education is to convince the family of its responsibility in promoting the health of its members for its own security. This can be achieved from the exercise of reasonable precautions in its way of living; from having an occasional check-up by the physician to vaccination and immunization (5).

Mother and child.

Mothers with young children form a group which is highly motivated and has a favourable attitude towards health care and education. Through the mother an attempt must be made to establish

sound nutrition and good food habits, and to maintain good health.

The teaching of parents concerning the principles of normal nutrition is an important factor in a well rounded plan for the pre-school child. The family physician and the visiting nurse should be the persons of choice to provide these services to all parents in the community. Particularly, the visiting nurse, by virtue of her many visits to the family is able to carry out her educational task and to correct defects. She is the liaison officer between the doctor, the baby centre, the health services and the home. Her routine duty in the health centre is important for she gives advice to the mothers how to handle the baby and the infant. She may give nursing care to a child in the home as an instructional measure but her main duty is to educate the mother how to care for the children. It is her duty to improve people's knowledge of health, and how they may prevent disease and obtain good health.for the whole family. She should endeavour to create a conducive attitude in the family toward the achievement of a high standard of health.

5. <u>The schoolchild and health education.</u>

Health education might be carried out among persons in health such as schoolchildren. Health teaching may be a specific or integral part of all aspects of school life and all branches of education. Within the school, health education is often a stepchild for it lacks the tradition of many other subjects. The value of a well developed health teaching programme in both elementary and secondary schools is not yet fully understood and recognised. The teacher however, can make use of his unique position to teach health matters. He is able to include health education in his total teaching assignment. He must be aware of the child's health needs and interest; and due to his knowledge of child development he is able to notice early stages of departure from normal in mental or physical development. The school teacher treats health education as an applied science. With the teaching capability of a teacher health instruction will develop greater

significance and status in students' minds and through them, in the community. The student is the best advocate of health teaching and he in his turn increases understanding and support for it. Where the school does little or no health teaching some one outside the school may bring about a change. This can be a member of the medical profession or a member of the parent teacher association. Despite the association's willingness to co-operate on matters concerning child health many head masters have still failed to make use of it. Teaching children the principles of healthful living is of paramount importance in the promotion of the general health of the community. While health teaching has sometimes failed to change the health habit and to influence the point of view among people, a good deal can be achieved with adults who are associated with the schoolchild. During the meeting of the parent teacher association a member of the health profession or a person who may be an opinion leader can and does give information to adults.

Health education in the school is mainly the function of the schoolteacher. The health officer or the school nurse may provide teaching materials and advice and may aid in the teaching programme. The key person, however, is the teacher and his presentation of the m material to the children. He may motivate children to adopt sound health habits and they in turn carry this favourable influence into their family which otherwise might not receive health education.

The teacher is in an ideal position in relation to parents, the officers of the health services and other persons in understanding individual needs and in planning to meet them. He forms an inspiration to his classes and provides creative leadership in dealing with health problems. Although he carries out these responsibilities in many different ways, he needs to have support and understanding of the parents and the community in reaching his objectives. To enable him to do this job he must have basic education in health, matters such as health education, nutrition, home economics, accident prevention, infectious diseases, hygiene and disease prevention. The most urgent task lies therefore in persuading the State and Governmental educational

authorities to incorporate health teaching in the curriculum of the teacher training.

Particularly in developing countries where malnutrition and water-borne diseases are the main killers and causes of illness among children and adults the teaching of sound health habits among children must be stressed for the influence of the teacher in these areas is far more significant than in more literate countries.

6. <u>The handicapped child and health education</u>.

The public feeling is in the main against rather than for, the handicapped child. This attitude goes back to earliest times. Then it was believed a child was born afflicted because of the sins of his parents or an adult was suddenly smitten with blindness or paralysis because of his own offences. Even disabilities which arose less suddenly as the sequellae of a disease were manifestations of the wrath of God(6).

Two main difficulties face the child born with a cleft palate. The main problem is that of obtaining food in order to maintain life and the second on a later phase, namely that of making himself understood through the use of speech (7). The aesthetic and psychological handicaps that may arise from this condition may also be of great importance. The fact that these children have to face more operations, nourishment must be as adequate as possible. The feeding of a child born with a cleft palate is a real problem and requires a special technique and full co-operation of the parents. The aim of health teaching is to convince the parents of the children with defects that the children are not necessarily defective in other ways. The child must be submitted to examination as early as possible, for there is no reason at all why the father and mother of the child must be ashamed by the fact that their child is born with a defect. Correct treatment and continued supervision by a cleft palate team can overcome the problems which have been raised.

7. Community Health Education.

Health education is one of the essential activities in the field of public health. Through its process individuals are not only motivated to adopt a healthy mode of living but also influenced to co-operate with and support public health programmes.

Health education is more than the supplying of information. It is more a continuing and active process of learning by experience. It is one of the basic methods that helps in a successful public health programme. What people do with facts and information that are given them depends less on the validity of the fact than on how they feel about it. The main purposes of health education of the community are:

(i) "to make health a valued community asset."

(ii) "to help individuals to become competent in and to carry on those activities they must undertake for themselves, as individuals or in small groups in order to realize fully the state of health."

(iii) "to promote the development and proper use of health services." (8)

No one professional group is fully responsible for health education. It is a combined duty of all professional groups that work with people and the government. In many countries the national or local health departments have a permanent staff of health education experts, who upon request aid in conducting conferences, in organising informational programmes and in publishing material. A library of health educational motion pictures is often maintained to provide the necessary projectors and film strips. Doctors, teachers, health educators and medical personnel must co-operate in order to be able to share knowledge and to use the results and as Ginsburg(9) wrote in her book: "There are too many nurses and doctors teaching who know the material but don't know how to teach, and too many teachers who have the technique but don't have the information."

8. The role of the individual professional worker.

(a) Physicians.

Every patient who visits the surgery and every house that is entered by the doctor gives an opportunity for useful educational work. When the physician is attending a patient who is suffering from a communicable disease, he may give the patient's family instruction how to safeguard the unaffected members of the family. This educational intervention may result in the application of preventive measures by the family. The doctor who considers health education as a specific part of his duties should,

(i) correct misunderstanding or confusion concerning illness;

(ii) instill sound knowledge concerning prevention of illness and protection of health in the minds of all his patients;

(iii) carry enough conviction with his teaching that his patients will be motivated to take the necessary steps which may be required to protect their health and that of their families.

(iv) provide an understanding of the influence of social and economic factors upon illness. (10)

(b) Nursing personnel.

Due to her intimate contact with the patient, the family and hospital the nurse has many important moments to carry out her educational programme in health. By virtue of her relationship with the patient and his family she has the confidence of the people she serves. She can translate scientific terms in simple words which can readily be understood by the patient. As she has a basic knowledge of the medical science she is able to observe physical and emotional situations which influence the health of the individual patient or of the whole community. She forms the link between the people and the health officers (11).

(c) Public health engineers.

Health engineers in all the health engineering grades and

categories often deal with people when they are peculiarly receptive to guidance. The health engineer has excellent opportunities for health education since he is also directly dealing with the community. He visits people in their home and their workshop. He is in continuous and close contact with groups in the community whose activities bear a special public health significance. He has the chance to meet food handlers while on his job and he might give instruction in hygienic food handling. He is in the position to correct faulty habits by giving demonstration on the spot since people learn more easily by seeing and participation than by instruction alone (11).

(d) The health educator.

It is not necessary for the qualified health educator to be a physician or someone with extensive medical training. The candidate for the position of a health educator should possess characteristics such as creative ability, leadership, good personal health, pleasing personal appearance and common sense. His professional responsibilities include:

(i) technical leadership in ensuring programme planning, in service training of health personnel, developing and improving health educational aspects.

(ii) establishing and operating public health information service.

(iii) selection, assembling and distribution of educational materials and visual aids.

(iv) organization and conducting meetings and conferences (12).

These responsibilities are best carried out by the person who has specific training over a wide number of fields including health, education and sociology.

(e) Social workers.

The social worker could also make a valuable contribution in

the field of public health education. Her practical knowledge of human behaviour and human relations enables her to share in the solving of public health problems. In many countries she is an important member of the public health team. The social worker in public health deals directly with people. To provide social services as in the case of the control of venereal diseases and tuberculosis, or she may assist the public health team as a resource person. Her knowledge of human relationships is very useful to train the individual worker of the public health team in the technique of counselling and interviewing and to help to increase the staff's capability to judge social problems (13).

9. Training of personnel.

In order to reach a high standard of health education skill it is necessary to specially train personnel.

In-service training affords a valuable means of developing the health education ability of many kinds of personnel who are engaged in health services throughout the country, and workers in related areas or fields. Seminar and practical fieldwork under skilful guidance can be of very great value in bringing knowledge up to date. The main objective of the in-service training is to extend the educational skill of the individual health worker who is interested in the field of health education.

Since the school can make a significant contribution to health, teachers should be invited to attend ~~th~~ courses, for it is of importance that teachers have had training in health teaching. For once they understand that health education involves instruction, environment and services and is not just a subject which is simply taught, a more tangible health education can be expected. Teachers should be taught what to discuss about problems of real life with the students in relation to their level of mental development.

During a post graduate training of medical and public health personnel, more attention must be paid to the technique of health education in different categories of people (14).

10. Media and Health Education.

The personal approach in health education is often supplemented by the use of various other media of communication. The use of mass media is often indicated where a wide audience is to be reached and these are considered under the headings of films, posters, pamphlets and booklets, charts and flannel board, radio and television.

(a) Films: They are used to stimulate the learners to think constructively about the problems. Films properly selected for content and of interest to the majority of the viewers are equal to a good teacher in presenting facts. It is, however, essential that the learner has a background of knowledge in order to benefit fully from the film which is shown. The main objectives of using motion pictures for health education are:

(i) to increase factual information
(ii) to provide exact demonstration for teaching skills
(iii) to provide motivation
(iv) to change habit and attitude (15)

As didactic media films have considerable power to serve large audiences and to stir them. The drawback of the film as mass media is its relative high cost. Film strips, transparencies in series for display on a screen or a view box may be very useful adjuncts to the teaching of health in the school, the surgery or for public meetings.

(b) Posters: A poster is usually printed and produced for wide distribution from material that could be -

(i) hand drawn and painted

(ii) duplicated from an original drawing
(iii) composite pictures built up from blending coloured illustrations from periodicals. (16).

The characteristics of a good poster are:

(i) simple, clear, eye-catching and meaningful
(ii) words will be very few and very sharp
(iii) letters will be easy to read
(iv) the colours will be bright

A good poster reproduces an idea at one glance and whether the poster utilizes a picture to help tell its story or not, the story should be as short as possible. It is suggested that a poster contains not more than twenty words... If a poster must tell a single idea at a glance then the viewer ought not to be asked to spend much time discovering the idea hidden in the picture. A poster may point up the central idea of a community health programme or it may attempt to create a sense of awareness of a particular facet of health or disease. For adults it is safe to be humorous about children, but dangerous to be fanciful with adult's characteristics or foibles (17).

The creation of a good poster is by no means a haphazard affair. Movement is one of the most important features in poster making. Diagonal placing of units creates the impression of movement and directs attention to one centre of emphasis. Colour contrast should be pleasant and the use of colours of equal value should be avoided. The choice of the basic material for poster construction depends largely on the purpose. If the poster is to be mailed it requires a lightweight paper but if the poster is intended to be used many times the material should be strong and stiff. Stiffness is especially desired if the poster should be designed to hang. ~~It~~ A series of posters must be of the same size to facilitate a neater display when hung in the halls, rooms or corridors (18).

(c) Pamphlets and booklets: Pamphlets and booklets have proved that they can play an important role. The booklet with the most attractive and colourful cover will be taken first. Eye appeal comes from an emotion-arousing picture or colourful layout or eye-catching lettering. If it is intended for the booklet to be carried home from the class, the clinic or the surgery room, then the booklet has to fit easily in a coat pocket. Lettering a booklet or pamphlet, is an art and if it is intended to make use of hand lettering on the cover of the booklet one should be sure of the service of an artist.

The printer of course plays an important role. The help of a skilful printer may turn the copy into a work of art. A cover printed separately on a heavier paper stock is preferable. This makes the booklet more attractive and livelier. The cover page bears the title and may be a picture. The inside cover can be blank.

A booklet has to give comfort and guidance to the reader who wants the comfort and the guidance it gives. Offer them a chance and they will read it from beginning to end (19). The most important factor is that the pamphlet or booklet gives to the reader the information which it is intended for them to have. The presentation and treatment of the content material may be a decisive factor in its effectiveness.

(d) Charts and flannel board: The use of charts, models, large photographs if well presented in a clear and effective way, may help the presentation of material by a lecturer or may be used to present simple factual material in displays and exhibitions.

The flannelboard or felt-board has been developed further in recent years and has proved to be a successful visual aid for teaching. It is particularly used during lectures and discussions to illustrate important points of fact. The construction can be made suitable for any particular situation. A piece of flannel, suede cloth or cotton velvet, one or two yards in size, is stretched over a piece of heavy cardboard

or light plywood. A rough grade of sandpaper is stuck over the entire back surface of a picture illustration or object to be used. When the rough sandpaper surface of the picture and a nap surface contact each other, they will catch and hold even when the illustration is held upright. Pictures and illustrations are attached and detached while the instruction or teaching continues. The flannel board permits also a greater amount of advanced preparation. It is important that the colours of the illustration contrast with the colour of the board. The advantage of the flannelboard is that it may be used many times and for various purposes. A series of illustrations on health matters may be collected and new pictures may be added continuously to the collection. The flannel-board is very useful in teaching schoolchildren nutrition and sound health habits (18).

(e) Radio: Research carried out in the U.S.A. revealed that only 5% of the population never listen to the radio. The vast majority of the community are "radio fans" and this part could become the future audience of a health education talk. Many of these radio listeners are, however, not heavy readers. So these people can only be reached through a radio programme. Educational programmes however, have a low listener rate and spot announcements particularly, will help gain public participation. Spot announcements are statements of fifty to a hundred words. They are prepared to be broadcasted in short programme breaks. The writing of these short announcements needs the services of a specialist who has the "know-how" in this particular field.

The writing of the script must follow the technique outlined by the studio. Instead of a spot announcement, the programme may be dramatization, a panel discussion or a simple interview about health matters.

One way to build up an audience might be the involvement of a number of people, preferably opinion leaders, in the production of a programme on health education.

Each person then becomes a focal point for publicity. His

friends and members of his group are interested because he is in the programme. Through them the circle is widened by word of mouth. Evaluation of the result of a broadcast can be measured by listener response (20).

(f) Television: Television is a combined form of the radio and the film. Today in many of the European countries television is becoming the poor man's most prized extravagance and in countries all around the world more and more people are being reached through this media. Television usually provides only an indirect flow of instruction. This is the main difference from the normal process of human communications. It is this particular limiting characteristic that provokes the most intense criticism of teaching by television. The same criticism, however, can also be made if lectures are dehivered in large classes or for the one way contact made over radio.

Generally the quality of both picture and sound is above the thresholds of perception, cognition and understanding (21)

III. DENTAL HEALTH.

1. Attitudes, beliefs and knowledge.

Attitudes, beliefs and knowledge in dentistry vary greatly as do those in medicine. There are many differences in the concepts of oral and dental disease and dentistry as a profession, by different societies and strata within those societies. There are many theories and beliefs about dental diseases.

Dental caries is the most common of these diseases and has affected individuals in almost all groups and societies in the past and present. Scientific studies on the etiology, bacteriology and epidemiology of tooth decay have been carried out for a long time but the nature of dental caries is still not yet fully understood. One of the beliefs about the origin of tooth decay which has still a lot of supporters, particularly among illiterate people, is the legend of the toothworm. The pain of toothache, according to this thoery is produced by a worm gnawing at the tooth.

The practice of tooth mutilations, staining or the knocking out of one or more teeth is still widespread in almost all the countries in the southern hemisphere from Argentina to Venezuela in South America, in Africa, Australia, the Philippines, Indonesia and many islands of the South Seas.

The front teeth in the lower or upper jaw or both may be selected for filling, dental decoration or a combination of both.

Artificial deformations of the teeth have taken various forms such as the forming of gaps and prongs, amputations of a crown or crowns of the teeth, removal of a tooth, dyeing from red to black, and adorning with metal. The reasons for these types of mutilations are very divergent.

An early, and today still widespread practice is that of the

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knocking out of a tooth, generally interpreted as a puberty ceremony in males (22).

The dyeing of teeth (black) was formerly also frequently found among the people in Indonesia and the reason for it varies from island to island. The teeth of some people in the Kedang area, in the South-eastern part of Indonesia, are not only dyed but also horizontally filed. The reason for this custom is generally assumed as a puberty ceremony although it is now no longer a common practice among the present generation.

The dyeing of teeth is not unique for this part of Indonesia but is also observed in some parts of the island of Java. The amputation (i.e. filing) of the incisal part of the teeth is frequently found among the females of central Java. The reason for this mutilation is considered as an aid to beauty. But on the island of Bali the filing of the front teeth has a far more important reason. This custom bears a relationship with the religion of the people on the island.

Another example of tooth mutilation as an aid to beauty is often found in several parts of Java where one or more of the upper incisors may be adorned with a kind of three-quarter crown. This crown is cast of a copper alloy which maintains its gold colour in the mouth and the "treatment" is carried out by Chinese dental mechanics who have been apprenticed with their fathers or family.

A widespread belief which still prevails in Java is the belief that blindness might be the sequela of an extraction of an upper canine. This assumption sometimes blocks the way to successful treatment and the dentist is forced to use all his educational skill to convince the patient that there is no relationship between the extraction of a canine and blindness.

Successful education of the patient in dental health matters depends on a knowledge of beliefs and attitudes people already have

toward certain fundamental problems. The attitude to dental health is unfortunately not so favourable since the rewards for regular dental treatment are not dramatically evident. But attempts must be made to improve this prevailing opinion using all the resources for education.

Teaching of preventive measures as well as teaching about correction of dental anomalies should be intensified and encouraged. The dentist, the dental nurse, the dental assistant, have their own place in the dental health team where dental health education is concerned.

An important person is the schoolteacher in the field of dental health education. His attitude exerts a great influence upon the school environment. A positive attitude of a teacher towards finding ways and means in the school, the home and the community for dental treatment will favourably influence not only the children but also the parents of the pupils.

A major obstacle in the way of dental health promotion in many countries is the apparent lack of interest and even indifference due mainly to the fact that dental decay is not obviously a cause of illness or death.

A large part of the population takes dental caries, pain and extraction, and the tooth loss due to periodontal disease for granted with advancing age, and their concept of dental health may not extend any further than this.

It appears that even where individuals or groups have a high standard of living, education, health motivation and contact with modern scientific dentistry, the concepts of dental health that are held may not be adequate to ensure best possible dental health with the knowledge at present available.

In the economically less developed countries people are

frequently apathetic and exhibit a resistant attitude caused by their extreme condition of poverty, lack of education and knowledge. Mass dental surveys on the prevalence of dental, periodontal and oral disease must be carried out in these countries not only as method of obtaining information in relation to these diseases but also as a useful aid for public dental health education.

Powerful attempts in the field of mass dental health education must secure the support and co-operation of the public as a requisite for a successful oral disease control programme. Involvement of local people, particularly key-persons, from the first stage of planning is a big leap forward in securing their positive attitude.

2. Prevention and control of oral problems.

(a) Dental caries:

The problems of the major oral and dental diseases and abnormalities and their prevention and control must be considered to obtain the basis for the information about dental health knowledge and practices which is needed by the public.

Among the dental diseases caries is the most prevalent, and the filling of carious lesions constitutes the largest part of the routine work in dentistry. Comprehensive studies of the prevalence of dental caries among populations have been carried out in many countries throughout the world. The findings of these surveys vary considerably from country to country dependent upon the socio-economic, racial, and geographic factors, and the dietary patterns.

Barnard (23) has shown that in New South Wales (Australia) more than 95% of the school children show evidence of past dental caries experience. An unhealthy mouth is a much more serious disability than many people realise. Besides the pain and trouble that may be experienced a dental condition may often result in serious interference with the general health.

Many workers have tried to prove Miller's theory that caries is a chemico-bacterial process. Bunting and his co-workers came to the conclusion that bactobacillus acidophilus was the organism most concerned in the production of carious lesions. They pointed out that a high carbohydrate food intake promoted the growth of these acid producing organisms. Experiments on animals in recent years have shown that caries will not occur unless bacteria are present. But it is still not known which bacteria produce dental caries in man and the peculiar factors which allow them to do their destructive work (24). That both factors, bacteria and carbohydrate, play a significant role in the production of carious lesions is shown by Orland (25), who raised animals in a germ-free environment. These animals did not show caries in their teeth when fed a high carbohydrate diet but their littermates in open laboratories are kept on the same diet in the presence of micro-organism do experience caries.

Kite and Shaw (26) on the other hand observed that caries susceptible animals which are maintained on a high carbohydrate regimen but fed by stomach tube, thus avoiding local contact with the teeth, do not show tooth decay.

Johansen (27), using a special technique made successful attempts to reproduce on susceptible areas of live hamster molars in situ the conditions which are required for caries development. On molars of immobilised animals a number of substances such as high sucrose diets, powdered sucrose, sucrose solutions, carious material from lesions in other hamsters, bread, acids and buffers, were applied topically to selected teeth at various time intervals. In these studies lasting for a few days some animals were fed by stomach tube while others were kept on a starch-containing stock diet. Sucrose was applied every twenty to thirty minutes, ten to twenty times a day. The lesions developed in this way were small but conspicuous.

The prevention and control of dental caries will depend on the restriction of refined carbohydrates; the creation of unfavourable

conditions for fermentable carbohydrate retention and breakdown by acid producing organisms; elimination of these organisms or acids produced; and the development of more resistant enamel surface and structure.

(b) Periodontal disease:

> "There appears to be general agreement that gingival deposits, such as calculus and plaque constitute the most important local etiologic agent for many periodontal diseases ranging from simple gingivitis to severe periodontitis. This opinion is supported by both clinical and experimental observation, However, the precise mechanism by which these deposits produce the periodontal disturbances is poorly understood." (28)

Periodontal disease is widespread and affects particularly those in the older age groups although the disease is not uncommon among children. The prevalence and extent of this disorder has not been measured adequately but extensive infection and loss of teeth indicate that the prevention and control of this disease should receive more emphasis and play a major role in preventive dentistry.

Chronic marginal gingivitis is so common that people have come to accept this state as an inevitable event.

The axiom that prevention is better than cure is fully applicable to periodontal disease. This fact is not yet fully recognized by the public and profession and much educational work must be done in this particular field. The dental profession must be prepared to spend more time to treat periodontal disturbances and prevent them by early removal of local irritations and instruction to his patients.

The dentist must be aware of the danger of poorly executed fillings which may work as a foodtrap while the impacted foods in their turn will give rise to a chronic marginal gingivitis with its sequela of periodontitis, loss of alveolar bone and supporting structures.

Dental health education must try to convince the patient that loss of teeth from periodontal disease is not a necessary occurrence and inform him that proper mouth hygiene and brushing technique to remove local irritations and prevent the formation of calculus could reduce the early loss of teeth.

The use of dental auxiliary personnel may play an important role since they can carry out periodical prophylactic treatment such as removal of calculus and other debris (29).

However, additional procedures are sometimes required for a successful treatment such as curettage gingivectomy, flap operations and selective tooth grinding. As periodontal disturbances in the later stages require specialised and intensive treatment every endeavour should be made to educate the people for prevention and early care.

(c) Malocclusion:

> "Malocclusion of the teeth is that variation in their relationship which extends beyond the accepted or usual range of variation for the species as found in the individual (30)."

Malocclusion is very prevalent among people, to an extent of 50% in the U.S.A. (31) and 75% in Australia (32). Teeth in malarrangement are more subjected to overload and susceptible to periodontal disease. Their malposition does not allow proper self-cleansing and they more readily collect food debris around them.

The degree of malocclusion varies widely from person to person, from malposition of a single tooth to malrelation of the whole dental arch and there are also numerous causes for these malocclusions, such as thumb sucking, tongue thrusting, lip and nail biting and other bad habits. But they can be also due to the effect of congenital conditions or abnormalities of dentition which affect the number, form and eruption of teeth or result in deficient or malfunctioning muscles and abnormal tongue development.

The benefit of orthodontic treatment is not limited to the restoration of the denture in order to enable it to fulfil its masticatory function for this complex organ has other important roles such as its function in speech formation. The influence of a good mouth appearance on the psychological development of the child may also be mentioned. A child with a receding chin, protruding upper teeth and short underdeveloped lips is often judged weak or stupid because of its appearance.

Since some of the athodontic cases have as their cause a premature loss of deciduous or permanent teeth more attention must be paid to the care of the primary dontition and the first molars. People must be taught to submit their children to a dental examination by the age of three or earlier if it is possible. Only regular treatment and visits to the dentist can prevent the otherwise inevitable loss of a valuable tooth. Early and adequate treatment save both the child pain, comprehensive treatment and additional parental expense.

(d) Oral cancer:

Cancer is a disease which is increasing as a major cause of death and is most prevalent in older people.

Cancer occurs frequently in the oral cavity. In the years between 1935 to 1946, 1,594 cases of cancer of the lip or buccal cavity were recorded by 29 American hospitals (Connecticut). Approximately 7% of all new cancer cases were found in the mouth or on the lip in males and only 2% occurred in females (33).

In the early stage of the disease both the symptoms and clinical manifestations are mild or may be absent. The proper treatment (if necessary, surgical removel of the precancerous lesions) must be carried out at the earliest possible stage in order to prevent further extension. The erroneous belief that all cancer is not curable is now untenable but is a commonly held view. The fear of

cancer in some Western countries is so strong that motivation of certain age groups to seek dental care and regular check-up of oral lesions may be easier than for the well accepted conditions of dental caries and periodontal diseases.

The dentist's role in the detection of early cancer is crucial for several reasons. First, his working time and interest are concerned with the oral cavity, and, therefore he has the opportunity to recognise asymptomatic lesions that may represent early cancer. Secondly, an individual who realises that something is wrong in his or her mouth will usually consult a dentist. Therefore, the dentist often has the first opportunity to recognise or suspect early cancer in the mouth, both in patients who may be totally unaware of anything amiss and in those who have complaints (34). Hence, adequate instruction in oral pathology and particularly in the detection of oral cancer must be regarded as vitally important.

(e) Infections:

There are many fungi,virus,and bacteria which cause diseases in or about the oral cavity. The disturbances they cause may be localised in the mouth. Of the many general diseases which can result in mouth lesions, tuberculosis, syphilis, measles, diphtheria, yaws, chicken-pox are the most important.

Tubercular lesions may occur at any site on the oral mucous membrane but the tongue is most commonly affected, followed by the palate, lips or buccal mucosa. The possibility of the dentist contracting an infection from his contact with patients who suffer from tuberculosis is a problem of clinical importance.

The oral manifestations of syphilis in the oral cavity as a part of the general symptoms are mainly during the secondary stage of the disease. During this stage of the disease, the oral mucosa may be affected giving so called "mucous patches" in the patient and these

lesions are highly infectious. The third stage of syphilis is sometimes characterised by a perforation of the palate. The intraoral gumma most commonly involves the tongue and palate. In rare cases the primary stage occurs on the lips or tongue.

The oral lesions which occur in the mouth during measles are known as Koplik's spots and have been reported to occur in 97% of all patients.

Of the viral infections which occur in the mouth recurrent - and primary, herpetic stomatitis should be mentioned. It is a very common oral disease which affects both children and adults. It is known by a great variety of terms such as aphtous stomatitis, and if localised as aphtae, aphtous ulcers or cold sores on the oral mucous membranes.

Of the diseases which affect the oral tissue only noma, Vincent's infection and actinomycosis should be discussed in a few sentences.

Noma is most prevalent in nutritionally deficient persons and it occurs mainly in children. It appears to start as a specific infection by Vincent's organisms but soon becomes complicated by secondary invasions of many other pathogenes.

Vincent's infection is an acute gingivitis which has been recognised for centuries. It is a disease which involves mainly young and middle-aged adults. The infection is characterised by a painful gingiva starting on the interdental papillae but spreads rapidly and may involve all gingival margins. The gingiva becomes very painful and tendsto bleed, and the patients are commonly unable to eat (35).

Actinomycosis may involve almost any part of the body. Primary lesions occur most frequently in the oral cavity, face or

neck. The onset of the disease is insidious and, if it does not follow some surgical procedure or injury, is first noticed as a persistent swelling, usually in the parotid or mandibular regions. The swelling is not painful, although it may be if secondarily infected.

Moniliasis is a mild infection of the oral mucous membrane characterised by the formation of white, curd-like lesions on the gum, sides of the tongue and buccal mucosa. The disease is associated with debilitating conditions, particularly in premature and weak infants and old people with low resistance.

Fatal complications from periapical infections are not very common. However, serious complications from periodontal pulpal infection are frequently found when the infectious process spreads to the tissues surrounding the posterior portions of the oral cavity, causing submandibular or superficial sublingual abcesses. From these areas the infection spreads by the fascial planes of the neck to areas where it becomes serious (36).

3. <u>The need for dental health education</u>.

Dental health education is a part of preventive dentistry which is often neglected and much additional work must be done and emphasis placed on this subject. However, the field of dental health education is very broad and has two aspects. One aspect is the teaching of the dentist and the other aspect is the education of the patient and community. Through dental health education attempts must be made to change the attitude of the dentist who considers the education of patients as unprofitable and beyond his daily routine duties. He must be convinced of his two-fold responsibility. His work is both educational and remedial and none of the two facets is less important (37).

In the field of preventive dentistry dental health education should play a major role. Of the dental disorders tooth decay presents a great challenge and only an early and adequate treatment of the

carious lesion can check the process which is not subject to self-repair. Experience and studies of this disease have given effective preventive and control methods and dental health education must motivate the profession to apply and the public to seek these measures. Much more attention must be paid to periodontal disease which is the principal cause of tooth mortality in adults. Dental health education must be intensified in the future in order to reduce the number of teeth lost due to periodontal disturbances. This disease may be prevented by simple measures.

The people must also be informed of the necessity of early treatment of malocclusions, conservative treatment of deciduous teeth and the replacement of lost teeth. The construction of bridges and dentures must be stressed in adults to avoid further deterioration of the dentition, a fact which is not yet recognised by the public.

Another aspect of dental health education is the teaching of sound dietary habits such as the restriction of the use of refined carbohydra tes, the reduction of consumption of sweets, sweetened beverages, chocolate, cakes and pastry between meals and the proper storage and choice of foodstuffs.

4. <u>Socio-economic factors and dental health</u>.

Since economic status is a major factor in the utilisation of dental care, there is always a vital interest of the dental profession in the economic position of the people. An increasing demand of fillings, dentures or other dental operations is a reflection of a growing national prosperity. The increasing need for dental care in a prosperous community has always two aspects -

(i) The capacity of the individual to pay and to visit the dentist.

(ii) A higher prevalence and incidence of dental caries due to the high consumption of refined foods and beverages.

Another factor is social pressure which forces the person to seek dental treatment since he likes to maintain an acceptable mouth appearance (38).

The expansion and growth of dental services in every country in the world should keep pace with the socio-economic progress in other fields. This development of dental health programmes not only has been encouraged by governments but is also greatly stimulated by people's increasing demand for dental care as they become more and more aware of the value of dental health as a major component of general health.

In a community where the level of education is high less dental health teaching is needed to motivate people to seek dental treatment. They are not only more willing to pay for dental treatment but they think not only in terms of the elimination of pain and infection, but also in terms of the restoration of serviceable teeth to good functional form, the replacement of missing teeth and preventive measures.

IV. DENTAL HEALTH EDUCATION.

In the new school of thought health education is considered on a par with curative services. Health education is a major field of the public health.

The teachihg of health matters means much more than to inform the public. Before a health education programme can be started it is important to know what people already know about health matters and their beliefs and attitudes towards health.

The learning process is a two way process. People must want to learn and people must have a certain amount of interest to improve their living condition, to change their habits, to overcome barriers, prejudices and traditions.

Health education therefore can be explained as the sum of experiences which favourably influence practices, attitudes and knowledge relating to health.

It is clear that the same basic principles are applicable on dental health education. In recent years dental health education has gained more and more importance and is now recognized as a powerful tool in dental public health particularly in the field of preventive dentistry. The achievement of good dental health depends so largely upon the individual initiative. The main aim of dental health teaching is to inform the mass of the people concerning the principles of preventing oral and dental diseases and how to make use of the existing dental services.

One of the functions of the practicing dentist is that of a health educator. As Dunning says (39), Dental health education means "helping people to help themselves and should be considered as important as direct service." The dental profession still places more emphasis on curative services rather than on those preventive measures which are

so important in the control of dental diseases in general.

Dental health education can be carried out in order to motivate the individual and community to -

(i) make dental health a valued community asset

(ii) promote the development and proper use of existing dental services.

(iii) carry on those activities which lead to better dental health (8).

The dentist must be aware of the educational needs of the patient and must carry out his teaching duty with real awareness. Individual brushing and nutritional instructions could be carried out in the surgery. He should give guidance to overcome dental and habit problems in the child. He can distribute dental health education materials among his patients and the literature which is given to the patient can gain much importance if it is explained in a few simple words by a dentist. It is for a busy practising dentist not easy to carry out his educational responsibility, but it is worthwhile to do it for clear, accurate information from a professional man could bear a profound influence on the patient.

Before something new is undertaken in the field of dental health promotion it is necessary to inform the public. The community will then be in a better position to understand and support the necessity for its acceptance. Many people are yet to be convinced of the benefits to be derived from preventive or even curative measures. It is really a slow and discouraging process but it is important to inform people of the necessity of preventive procedures which will safeguard the dentitions of the coming generation. A good example in this regard is the fluoridation of the communal water supply, a most effective measure for prevention and control of dental caries which cannot be made a part of a community's services unless the authorities have the knowledge and motivation to accept and implement this procedure.

1. Dental health education for the individual.

The individual must have a body of knowledge and motivation in order to achieve a certain level of dental health. The principles and practices that an individual may follow to realise better dental health can be summarised as the right food, good habits, good oral hygiene and regular dental treatment.

The individual can keep the carbohydrate content of his diet as low as feasible consistent with an adequate calorie intake and where carbohydrates must be used the soluble or less refined forms of carbohydrates should be prefered.

The individual person is able to maintain good habits such as brushing his teeth after every meal, rinsing vigorously after eating, the use of dentifrice as an aid to oral hygiene, the application of the right tooth-brushing technique. He can avoid between meal snacks, since the consumption of refined carbohydrates is extremely harmful particularly if rinsing or tooth brushing is not carried out during this time. Acid-producing micro-organisms produce during this time interval enzymes as a product of their normal metabolic activities, which in turn convert sugar to an attacking agent of an acid nature. This acid dissolves inorganic material of the tooth.

It is obvious that oral hygiene is an essential requirement if dental health is to be maintained. Tooth brushing cleans not only the teeth but prevents accumulation of the deposition of calculus, and stimulates the gingival tissue, both important factors in the prevention of periodontal disease. Knighton (40) stated that the consumption of apples, sliced oranges and some other coarse foods will reduce oral debris to a degree even superior to that attained by tooth brushing with a dentifrice for three minutes.

It is clear that the role which the dentist can play in the individual's dental health is a significant one for he is not only able

to render him services but his role as dental health educator is as important as his curative responsibilities. The dentist should motivate his patients to change bad habits such as nail biting, thumb sucking, tongue thrusting, the habit of cutting thread by biting, heavy pipe smoking. He should persuade the patient to have a half-yearly dental check up and to submit every deviation of the oral soft tissue to a careful examination, particularly among the older people who are more liable to oral cancer.

(a) Diet and Nutrition.

It was not very long ago that the relationship between food and the individual's health was realised. In early days it was believed that the intake of food was largely a matter of family taste and preference. The food was regarded as adequate if it was able to satisfy the demand of hunger. Under certain conditions this fact might be true but it is realised that a modern community requires more careful nutrition planning and a knowledge of basic needs of the family and its members are to be maintained on a healthy nutritional basis. It is the housewife's hard job to provide the family with proper food, well balanced in all its components, and never theless at a reasonable cost.

The promotion of adequate nutrition is a community responsibility which takes time and needs a vast amount of patience. It needs the translation of scientific and current findings into terms which can be readily understood by the people.

Eating is such an essential part of the daily life that it is taken for granted. Today, however, food has become a question of world wide significance with regard to its relationship to toothdecay. A properly and scientifically designed diet pattern can contribute a lot to control of dental disease. Diet looms as the companison weapon of fluoride to defeat dental caries. There is a mounting body of evidence from human and laboratory studies that diet can keep toothdecay under certain control.

Primitive people who were formerly free from tooth decay begin to show caries as they come into increasing contact with civilization and start to change their natural protective foods to refined foodstuffs. Even among tribes of primitive communities there are striking differences in the prevalence of tooth morbidity, apparently due to their different diet. The effect of coarse fibrous foods and the masticatory action associated with this type of foodstuffs is often not fully appreciated, although there contribution to the health of teeth is a valuable factor. It is now a well known fact that diet can clearly effect resistance and susceptibility to decay although the mechanism of the differences is not yet fully explained. But the role which is played by fermentable carbohydrate and bacterial plaque is to a certain extent understood. The groups of carbohydrates considered important in the dental caries process are-

(i) simple sugars (monosacharides) typified by glucose

(ii) complex sugars (disacharides) typified by canesugar and lactose

(iii) polysacharides, typified by starch and cellulose (41)

Dental plaque is the name given to a gelantenous deposit which is often found adhering to the teeth and consists of bacteria and their products food and cellular debris (70). Dental plaques and carbohydrate form the two major components in the caries process.

Carbohydrates possess different degrees of caries potential dependent upon the type of carbohydrate, upon its concentration in the diet, the time it remains in contact with the teeth under the plaque and the frequency of ingestion.m The caries producing factor of a carbohydrate depends much on the physical properties of the matter, whether it is liquid or solid, natural or refined, and its adhesiveness. Finely powdered and refined sugars are very strongly cariogenic while a sugar in liquid form is less harmful. It seems that the addition of fat decreases the potentiality of the carbohydrate to produce caries, presumably due to the forming of a protective layer by the fatty agent(42).

Data collected in Europe revealed that there exist direct and indirect influences from the reduced intake of refined carbohydrates during war time rationing. The restriction of the use of sugars had a direct action in reducing the prevalence and incidence of dental caries and the use of more natural and protective foods containing trace elements may also have given teeth which were more caries-resistant. The lower sugar intake might have improved mineral metabolism in such a way as to decrease caries susceptibility.

Much more research is certainly needed to clarify how various foodstuffs can give protection and what nutrients are beneficial in the different stages of tooth development.

The application of the knowledge about carbohydrates and caries is most evident in the case of rampant caries. The patient can reduce the caries activity by reducing his sugar intake while the dentist is able to judge the effectiveness of the food pattern with the help of lactobacillus counts or other caries susceptibility tests.

One of the dietary control methods is that of Jay (43) and consists of the exclusion of sugar and the elimination of all refined carbohydrates except 100 gr. daily for a period of two weeks. After two weeks the patient progresses to plan 2. During this stage carbohydrates other than sugar may be eaten. If after a fortnight the lactobacillus count is maintained on a low level plan 3 is instituted. The carbohydrate intake is now no longer restricted and includes sugar with one of the meals each day. If the lactobacillus count after a further two weeks does not show a higher level the patient progresses to plan 4 whereby sugar may be consumed without any restriction. The situation is now that in which the person is returning to his original diet. Why the index does not move up while the patient is enjoying his former diet pattern is not clear.

A suggested day's menu for carios prevention and control -

Breakfast: orange juice (8 oz.)or ½ grape fruit without sugar
whole grain wheat cereal with milk or butter
1 or 2 eggs with bacon, sausage or ham
100% whole grain toast
1 square butter
1 (8 oz.) glass milk

Lunch: cream of pea soup
cottage cheese on lettuce
slices of cold meats
100% whole wheat bread
1 square butter
1 (8 oz.) glass milk

Dinner: lamb stew (6-8 oz.)
baked potato, carrots (buttered)
100% whole grain bread
2 squares butter
lettuce salad with French dressing or mayonnaise(without sugar)
custard, yellow cheese, nuts (gelatine desserts without sugar)
1 (8 oz.) glass milk,
coffee or tea, without sugar.

School Lunch: 1 pint milk
thermos of hot soup
sandwich - use 100% whole wheat, rye or pumpernickel with butter or plain
3 oz. of meat between two lettuce leaves
carrot sticks, celery sticks, tomato, hardboiled egg or square of cheese
plain nuts

The suggested outlines of the menus can be adjusted requiring a larger or smaller intake of foods. Size of servings determine the calories and other dietary factors. The detail of the diet must be discussed with each patient.

No foods before bedtime and fruit only in the morning. The diet can be supplemented with vitamin tablets (44).

The individual may use dietary fluoride supplements to bring

the fluoride uptake up to an optimal level during the period of tooth formation. This supplement to the diet appears effective (45) in helping to prevent dental caries but its use is limited since the supplement has to be maintained for ten or more years in order to cover the period of tooth formation and eruption in the child. It is evident that an extremely high degree of motivation and persistence is required by the parents to see that the supplement is given daily throughout this long period. In spite of this limitation it may be desirable to prescribe fluoride supplements for young children in cases where the parents may be expected to follow directions carefully. Written directions should be provided according to the age of the child as follows (46) :

1. "Before two years of age. Add one fluoride tablet, containing 2.2 mg. sodium fluoride to each quart of water used for drinking purposes and for the preparation of formulas other than food.

2. "From two to three years of age. Every other day add one fluoride tablet, containing 2.2 mg. sodium fluoride, to an amount of fruit juice or drinking water which the child will consume at one time.

3. "After three years of age. Administer one tablet containing 2.2 mg. sodium fluoride, each day in an amount of fruit juice or drinking water that will be consumed at one time.

"Supplementary fluorides should only be prescribed when the concentration of fluoride ion in the communal water is less than 0.7 part per million. In localities where the drinking water contains a known level but less than 0.7 part per million the prescription of fluoride solutions may be recommended. The prescription

sodium fluoride	0.132
distilled water to make	240.0

is valid for use when the drinking water is devoid of fluoride. The concentration of fluoride may be adjusted downwards by 10% for each 0.1 part per million of fluoride ion in the water supply. If the drinking water contains 0.6 part per million of fluoride ion, the prescribed amount of fluoride must be reduced by 60%, that is, to 0.053 gm.

The solutions should be used in accordance with the child's age as follows:

1. "Before two years of age. Add one teaspoonful to

each quart of water used for drinking purposes and for the preparation of formulas and other food.

2. "From two to three years of age. Every other day add one teaspoonful to an amount of fruit juice or water that the child will consume at one time.

3. "After three years of age. Each day add one teaspoonful to an amount of fruit juice or water that the child will consume at one time."

It is an undebatable fact that the shortage of dental personnel will continue for many years, and that therefore preventive measures should be stressed rather than curative measures.

(b) Oral Hygiene.

There are not many comprehensive statistics showing the numbers of people in a country as a whole suffering from dental disorders. But it is beyond any doubt that this number is considerable particularly in countries with a high consumption rate of refined foods. Dental caries and periodontal disease have a close relationship with the consumption of refined foods and the lack of chewing exercise as did our early ancestors. Due to this fact replacement of the cleansing action of coarse and fibrous foods must play an important role in the maintenance of oral hygiene. Mouth rinsing and tooth brushing a short time after every meal should reduce the caries incidence to a certain extent. The massage and stimulation of the gum, the removal of oral debris and the prevention of formation of calculus can be achieved with the correct use of the toothbrush. This will definitely help in the prevention and control of periodontal disease. The toothbrushing techniques are considered in more detail.

Scrub technique. Using this technique the brush is grasped firmly and the occlusal surfaces are scrubbed carefully in the same way as scrubbing a wooden floor. The technique is only applicable on the occlusal surface of teeth but is used as a preliminary to all other techniques.

Fones' technique. This method is fairly effective and particularly recommended for young children who cannot yet adopt a more complex technique. The teeth are held in occlusion and the brush is held firmly against the teeth and gum and moved in circles with a diameter as large as possible. Interproximal spaces, however, are not cleaned adequately.

Roll technique. The bristles of the brush are placed as high as possible in the vestibule of the buccal region, with the sides of the bristles touching the gum. The brush is then moved occlusally while exerting a lateral pressure. During this movement the bristles are held continuously against the gingival tissue. As the brush approaches the plane of occlusion it is turned slowly while permitting the bristles to touch the enamel. Due to the pressure the blood is forced out of the capillaries of the gum. Moving the toothbrush allows the blood to stream into the capillaries again. An average of eight strokes toward the occlusal surface on the same place will massage the gum and clean the teeth at the same time.

Charters' technique. The brush is placed upon the labial or buccal side of the teeth, partly resting on the gingival tissue, with the bristles pointed at about 45 degrees angle to the long axis of the teeth. Some pressure is exerted on the handle of the brush, strong enough to produce a blanching of the gingivae. The brush is now given a rapid but slight mesio-distal movement while the pressure is maintained. The effect is that the bristle ends remain actually on the spOt upon which they have been placed. The aim of this technique is to penetrate and clean the embrassures, while at the same time a vibratory massage of the gum is produced The same procedure is repeated on the lingual side of the teeth.

The most frequent mistakes are:

1. Placing the brush too high on the gingiva and hence producing irritation of the mucosa.
2. Allowing the bristles to exert a scrubbing movement (47).

Physiologic technique. Some authors recommend this technique recognising that food is deflected apically during mastication. So toothbrushing has to follow the same direction from the crown toward the root. The technique is simple and stimulates the free gingiva and interproximal spaces adequately. The use of a very soft kind of brush is of course essential.

Combination technique. There is no technique which can meet the individual requirements of a patient. A combination of some methods is perhaps the most effective technique. This depends on the dentist's evaluation of the personal needs and the skill of the patient (48).

Dentifrice: With increasing advertising the public is using more dentifrice but it is becoming more confused about which product to select for use. The purposes of the use of a toothpaste are:

1. To aid in polishing the accessible surfaces of the teeth.
2. To aid in making the brushing procedure more pleasant.

A good quality dentifrice may not:

1. Contain ingredients which are harder than the tooth structure or which are able to stain the teeth.
2. Contain fermentable carbohydrates
3. Contain components which are harmful for the oral soft tissue.
4. Contain ingredients which inhibit the secretion of saliva (49).

There are dentifrices on the market which are claimed to contain therapeutic substances such as -

1. alkaline and neutralizing agents
2. antibiotic agents
3. antienzymatic agents
4. enamel modifying agents

Fluoride dentifrices. Considerable research has been carried out to investigate the value of dentifrices which contain stannous fluoride. The results of a recent study on the effectiveness of sodium and stannous fluoride dentifrices was reported by Muhler (50) and his co-workers. These studies have shown that a dentifrice containing 0.4 % stannous fluoride caused a significant reduction in dental caries. The stannous fluoride, however, must be in a stable form in a dentifrice, and this condition can be obtained by using a fluoride compatible polishing agent, calcium orthophosphate, as one of the components of the toothpaste.

Clinical trials are necessary in order to be able to evaluate the usefulness of a stannous fluoride dentifrice due to the limitations of methods testing its value only by laboratory means. In the processing of the data obtained from clinical trials a number of aspects must be studied -

1. Does the stannous fluoride dentifrice produce an initial and immediate reduction in caries?

2. Is the effect maintained or altered in any way by continued use?

3. What are the age group or groups affected?

4. Do the results reported depend on the toothbrushing technique and frequency? (51)

Much has been written and advocated about toothbrush design and the action of toothpaste. Through mass media such as radio, television and newspapers, manufacturers claim special properties for their products. These claims may or may not be true but their propaganda campaign has one important aspect. It does educate the people even though this type of teaching is not so effective as face to face education. In this respect the pharmacist and chemist are in a better position. He is able to influence the people directly and the dental profession must pay more attention to the educational potency of these occupations.

Mouth washes: The council on dental therapeutics of the American Dental Association does not recommend the use of mouth washes by the lay public although some manufacturers claim a therapeutic value for their products. Mouth washes have no other effect except their mechanical rinsing action (49).

(c) Regular Visit to the Dentist.

It is obvious that in the field of dentistry not much can be done without the help of the individual and an important aim of dental health education is to motivate the individual person to visit the dentist regularly. Since dental health, if compared with other health subjects, is on a low level in the public acceptance scale, a strong motivation is required to motivate people to maintain their dental health on a high standard. The reason for this attitude is that dental disease does not form a direct danger to life and limb as does general illness such as tuberculosis, poliomyelitis and other crippling diseases.

A few basic motives which appeal to individuals to help them to appreciate good dental and oral health are:

to improve and maintain good appearance

to maintain or increase masticatory capacity

to avoid pain, long lasting and expensive treatment

to keep teeth throughout life

to prevent periodontal disturbances due to calculus deposition (52)

2. The Community and Dental Health Education.

In a field such as dental public health, education of the public is as important as curative services. Dental health education is therefore a major endeavour for the public health dentist.

The erroneous meaning that dental health education will increase the demand for dental treatment which can not be met must be abandoned. For the aim of dental health education of the community is not only to motivate people for desirable dental health practices but is also to influence the public to participate in and support dental health programmes e.g. the establishment of efficient dental services, the fluoridation of the water supply. And since the community consists of individuals dental health education and dental health procedures can be carried out on a community as well as on an individual level. Both methods will be considered in the following sections.

(a) Dental needs and resources.

Dental needs and resources obviously vary from country to country and from race to race. The dental needs in a community are determined by -

1. the prevalence of dental diseases
2. the demand for dental services
3. the general attitude toward dentistry.

Among the dental diseases toothdecay presents perhaps the major part during early life while periodontal disease forms the greatest challenge in the adult population.

In Many countries where the dentist population ratio is not favourable priorities are usually made for:

1. relief of pain
2. conservative treatment
3. tooth replacements
4. preventive procedures.

Alleviation of dental pain can be carried out by a dentist, a doctor, a nurse or even by a layman, while conservative treatment and tooth replacement require more skill and hence must be carried out by persons who have had a special training to do the job. But in more developed countries and particularly in the higher income level the dental needs consist more than merely tooth extraction. As the educational level and the income of the individual increase there is a greater demand for filling and fixed dentures. The number of teeth per person which need a filling displays a steep rise before the age of 20 in both sexes and the need for restorations decreases after the age of 30 years.

Moen's (53) report revealed that after the age of 40 years the number of extractions increased remarkably as a result of periodontal disease. The need for bridges was greatest for men and women in their twenties and thirties. One fourth to one fifth of the patients in the 20 to 30 year age group required an initial fixed bridge. About one out of every six adults, of 15 years of age and over, needed their first partial denture and nearly one out of the 20 patients needed a second partial denture. These figures were calculated in 1940 and applied only for the American white population.

Among the families with incomes of over $ 7000 54% had seen their dentist the previous year while among families with incomes of less than $ 2000 it was 19%. Eighteen per cent of the population had never seen a dentist (54).

The ratio of population varies considerably from country to country, even from state to state. The most favourable ratio is found in Scandinavia (1:1.600) (55) while the figures for Asian countries are much higher. But in many countries the increase of dental manpower has not kept pace with the need and demand of a rapidly growing population. To meet this expanding need some countries have introduced the dental nurses. Since these auxiliary personnel are also highly trained they can render services to a considerable number of the population, partic-

ularly to those who cannot afford to pay the private dentist.

The problem of the lack of manpower in dentistry is a complex one. In many countries the number of graduates is small and the few who have finished their training tend to cluster in large cities, preferring to provide services for the upper-income groups, while the unqualified practitioners, spread throughout the whole country remain to render services for the people who cannot afford to spend much money for detnal treatment. No gradual replacement can be observed of the illegal and unqualified workers by fully competent dentists since each one has oriented toward the meeting of the demand of different population groups.

(b) Prevention and Control of Dental Caries using Fluoride.

Topical Application: In 1942 (56), Bibby had already shown the favourable effect of topical applied sodium fluoride solution in a concentration of 1/1000. In one study a caries reduction of 46% in the permanent teeth was observed in a treated group. Encouraged by these results the clinical effectiveness of various fluorides compound have been tested in different solution concentrations and with various techniques of application. The procedure most frequently employed is that of Knutsen in which 2% solution of sodium fluoride is applied in a series of four spaced applications of the dried surfaces of the teeth. Prior to the sodium fluoride application the coronal surfaces of the teeth should be thoroughly cleaned using rubber cups and fine pumice (57).

There is reason to assume that the topical use of sodium fluoride is most suceessful in newly erupted teeth. The recommended time for application is therefore at the ages 7, 10 and 13 years, corresponding with the average eruption time of the various permanent teeth. For application to deciduous teeth, children 3 years of age have been successfully treated.

Recentay, several studies have shown the apparent superiority

of stannous fluoride. It is, however, unstable in solution so it must be prepared fresh, immediately prior to its use. Other difficulties with stannous fluoride are its unpleasant taste and sometimes pigmentation of the treated teeth occurs. And since it has also astringent properties it can elicit a copious flow of saliva which is not compatible with the required dryness of the treatment field (58).

The topical use of stannous fluoride or sodium fluoride on mass basis requires, however, a large number of professional staff and needs much surgery time and motivation of the patient. In a number of countries, the dental nurse is trained to carry out these treatments resulting in lower community costs for the programme. Dentifrices containing stannous or sodium fluoride may be recommended or used on a community level when the dental manpower is very limited.

The supplement of dietary fluoride has been discussed but on the community level it may be possible to use fluoride supplement in tablet form or in some other vehicle such as milk. The practicability and difficulties of supervision create many more problems than in water fluoridation. Where it is considered that such a programme can be implemented dental health education will be required to motivate people to practice the recommended principles and if milk is to be used as a vehicle, to motivate the milk distributors to co-operate.

Water fluoridation. Water fluoridation as a public health measure is gaining world-wide interest as an aid to control dental caries. As is the case for any disease, the ideal solution of dental decay is prevention and efforts to do so have taken many forms, but none of the methods have effectively succeeded in controlling dental caries.

In 1931, fluorine in the domestic drinking water was at last identified as the cause of mottled enamel, a condition which had been recognised a long time ago. It was Dean's studies which clearly demonstrated the definite relationship between mottling of the teeth,

the content of fluorine of the water supply and the reduction of the caries prevalence. These studies demonstrated that there is an inverse relationship between the fluoride level in the water and the prevalence of dental caries. Subsequent investigations have shown that mottling becomes less severe as the fluorine content in the drinking water decreases so that at a level of about 1-1,5 ppm. it is not of public health significance while the prevalence and incidence of dental caries is very much reduced (59).

After very comprehensive studies on the effect of fluorine on the body which have proved that flurine in a concentration of about 1 p.p.m. does not endanger the general health, it was decided to start a water fluoridation programme at Grand Rapids and shortly afterwards at Newburgh. In each case, fluorides were added to the water supply to increase the concentration up to 10-1,2 p.p.m. and for each area a control area was selected.

These pilot projects were planned to extend over a period of ten years. By the end of this time, children born early in the study period had developed the primary dentition while a part of the secondary dentition had come into function. The resistance against dental caries was then appraised. Arnold and co-workers reported a reduction of decayed teeth of not less than 66.6% in the 6 year old Grand Rapids' children. This report included only the findings in regard to dental caries in "continuous resident" children. The effect on the 16 year-olds was not so striking but revealed nevertheless a decrease of caries of 18.1% (60).

Despite the favourable results of the fluoridation of drinking water there are still people who object to this useful public health measure. They argue that water-fluoridation is a kind of mass medication. Still another group have objected on the ground that it is unsafe. It is true that communal water treated with fluoride is used for purposes other than drinking, but it has been found more practical to have the entire water treated than to attempt to treat the drinking water

separately. It remains for the dental profession to help in educating people so that they will understand and come to realise that water fluoridation is a cheap,beneficial and safe method for caries control.

The addition of fluorides to public water supplies has proved to be a relatively simple mechanical procedure. The range of cost has been shown to vary widely. The reported variation in cost was due to the characteristics of the city and the chemical used. Bull and co-workers have demonstrated that the cost of water fluoridation can be anywhere from 4 to 5 dollarcents per capita annually where silico-fluoride is used and 10 to 14 dollarcents per person per year where sodium fluoride is the fluoridating agent (61).

The equipment which is required to fluoridate the domestic water cannot be regarded as a financial burden. In according to Bull, the appliance for adding fluorides to the communal water supply varies in cost from $ 500 in small cities to several thousand dollars in larger communities.

A well co-ordinated and comprehensive dental health education campaign is needed since the adding of fluorides required not only the help of the community but also the support of the politicians who directly or indirectly have to make the final decision in parliament or the city council. The dental association must co-operate with the medical association in order to be able to influence local or national leaders and to combat the anti-fluoridation group. Water fluoridation could become particularly in Australia a successful public health measure since 6.6 millions or almost two-thirds of Australia's 10.6 million population are concentrated in fifteen cities (62), all of them with an adequate communal water supply. This means that if water fluoridation can be accepted as a general public health measure, the large majority of the Australian population will receive this protection against dental caries.

(c) Dental health education in the surgery and waiting room.

The "salesman" in dental health education would be in most cases the dentist. Those who protest that he is too busy to spend time educating the patients should be aware that advice from a professional man who has the confidence of the patient, carries much weight with the lay person. It takes only a few minutes to give advice and much trouble can be avoided.

Wherever the dentist may work, he has three parts to play. He is at one time a propagandist, a specialist and a therapeutist. The three roles converge in a single and common aim, the improvement of people's dental health. In his surgery room as he is treating a patient, the dentist is exerting a very important individual influence. During treatment he has the opportunity to create the favourable climate that is so necessary for successful dental health education (63).

He can put emphasis upon the care of the mouth and teeth which is not a pre-occupation that is merely subsidiary or independent. In his dental chair children and adults from all layers of the community will come to realise the importance of their teeth. The education of the individual is the necessary complement to the clinic. Without this education only one half of his task is done.

The time which the patient or his relative spends in the waiting room may not be wasted. These moments could be used effectively to teach the principles of dental health. The inseption of a group of slides mounted on a card and backed with a sheet of opaque paper in the front of a box with a lamp in it does a good job. Sets of slides of various dental conditions could be inserted and changed from time to time. Giant models of teeth and their supporting tissue are certain to attract attention. Full mouth models, slightly larger than natural size can show the detrimental effect of dental and periodontal diseases(16).

(d) Dental health education of the pre-school child.

An adequate diagnosis of dental conditions involves more than a clinical examination of the teeth for cavities. The general health, physical and emotional condition of the young child are also of great importance. The majority of pre-school children are physically and emotionally capable of undergoing dental treatment. It is also necessary to determine the child's sibling relationship. The only child or the youngest in the family may lead to overprotection on the part of the parents. Such children at times may not be adequately prepared to undergo dental treatment since he lacks the courage which is so highly needed.

Since the young child is very impressionable and sensitive to the views and attitude of the family towards dentistry, his first reaction to dental treatment is greatly influenced by the reaction of his parents and other siblings.

The manner in which the dentist manages a child at the first visit has a considerable effect upon the future behaviour and far-reaching consequences on dental treatment planning. An ideal treatment programme can be set up for those children whose are co-operative and emotionally stable and whose parents have a great interest in the child's dental health (64). Parents with lack of interest and knowledge about dental care and dental health require guidance and education. They must be taught about the importance of the maintaining of deciduous teeth, the sequelae of premature loss of temporary teeth and the role of the first dentition in regard to the child's appearance. Dental health education of mothers with young children must be stressed for the idea still exists that the conservation of the primary dentition is not important since new teeth will erupt by the time the child has reached the required age.

Dental health education may be carried out through baby-health centres by the nurse in charge or by the doctor. The nurse may teach
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the mother how to design a well-balanced food pattern which contains the required calories and proteins but in which the contribution of refined carbohydrates is limited. By an inspection of the child's mouth the doctor may refer the patient to his family dentist if caries process is observed, for in some cases the mother is unaware of this fact. Hospitals are places where the patients are highly susceptible to dental health and health education. The care of the teeth in children's wards should not be neglected for this is a unique opportunity to train them in oral hygiene practices on an individual or group basis. Children can successfully be influenced to practice dental health principles by information imparted through plays, such as the provision of props for puppet shows dealing with oral hygiene (65).

(e) Dental health education at school.

Within the framework of the activities of dental health education, priority must be given to the teaching of oral hygiene to school children, for this time is a period wherein the child is very impressionable. Particularly when funds and resources are limited, the training of the school children in order to effect "from below upwards", a systematic and effective health education of the population should be emphasised. Through these educated children, the parents and other adults, will be automatically influenced. The giving out, in co-operation with large industrial firms, of a case containing a tooth-brush, dentifrice and an explanatory note as well as a pamphlet, is an exciting event for the child. This present will exert a considerable influence not only on the pupil but also on the other members of the family. The erection of water fountains in schools may also be very useful, which can be used as the centre of tooth-brushing drill and at the same time advantage should be taken of the spirit of competition. In conjunction with other activities, such as the annual meeting of the dental association, children may be guided to dental exhibitions while a competition in writing an essay on dental health practices may be organised.

Oral hygiene as a subject can be made interesting for young people to relate it with fairy stories or comics. If these works are kept up to date and adapted to local or national circumstances, they will certainly hold the interest of the readers. By identification the young reader may be motivated to practice the dental health principles.

To build a positive attitude in the older child, say in the 6 to 15 years old age group, towards dentistry, dental health education may be given during the periodical examinations. Lectures on oral hygiene, possibly illustrated with films or lantern slides, may be delivered by the teacher as a part of his teaching responsibilities, while posters can be displayed in the school corridors and leaflets and booklets distributed among them. With adolescents more emphasis should be given to explain oral disorders and therapeutic measures. Preventive procedures such as topical application of fluorides, dietary supplement of fluoride may be discussed.

It is obvious, however, that before a dental health education programme can be started the first thing to do is, to teach the teachers,the dentist,and his auxiliary personnel to do the job properly and where possible also the school medical officer and his assistants. Teachers could be taught by means of special courses while attempts should be made to include the study of dental problems in the curriculum of medical students. Education in dental health may not be separated from general health education; on the contrary, it should be integrated with it. Dental health education is a true social activity which adds to the improvement and the maintenance of good relations between the dentist and the public (66).

Children suffering from cerebral palsy form a group of patients which need special consideration and dental health education to the parents and to staff members of institutions can do much work to improve the dental condition of these children.

Oral hygiene which can be achieved by normal children by

means of the toothbrush and the self-cleansing effect of coarse food is not feasible by these patients for some cases are even unable to tolerate a toothbrushing action, without retching or even vomiting. Parents must be taught to reduce therefore cariogenic foods as much as possible and to try to clean the teeth as much as the child is able to tolerate. Stimulation to the gingivae can be obtained by introducing thin slices of bread and of crisp foods as the child is able to chew(67).

Parents of haemophiliac children must certainly be taught about the great importance of the conservation of the teeth since surgical treatment can be lethal for these patients. ~~One~~ No one group needs more dental health education and information than the parents of haemophiliac children. Reducing of carbohydrates and early and adequate dental treatment might be able to prolong the life of the child.

The co-operation of dentist, physician and other specialists is often required in hamdicapped children not only for dental treatment but also in designing mechanical aid e.g. obturators for children with cleft palate and a mouth piece fitted to the teeth, as a mechanical aid in typing for handicapped individuals (68).

(f) <u>The aged and dental health education</u>.

The group of aged people need, from a dental point of view, some consideration for a high percentage of them are endentulous or the remaining teeth are already in bad condition. In most cases a denture will be necessary but for some of them the denture becomes a disappointment. The reason for this is the fact that the learning capacity of aged people has diminished and the second reason is the atrophic changes which have taken place in the supporting bone tissue. The visit to the dentist for old people has still another aspect i.e. the examination of the oral cavity for cancer and leukoplakia which tend to occur more in aged persons.

The socio-economic status of the aged people is also a

factor which plays an important role in the demand for dental treatment by this group. Denture occupies the third place of unmet needs of persons in the 65 year old group in California which receive old-age assistance (69). Since the insurance schemes in many countries do not include dental benefits these people cannot afford essential dental treatment without governmental support.

(g) The community and dental health education.

Some of the major obstacles encountered in dental health education in the literate and illiterate countries is the apparent lack of concern and even indifference due mainly to the fact that it is not a cause of death and the assumption that dental decay is not a cause of illness. The vast majority of the people appear to take dental disease for granted. Leaving aside the "loss" due to dental "ill-health" in terms of pain and discomfort the "loss" resulting from dental decay and its sequelae including loss of work must be assumed to be considerable although it cannot be expressed in terms of money. One aspect is the cost spent on dental tpeatment and the other one is the loss in productivity of a country through the absence of the worker from his work and the time he has to spend in the waiting and surgery room for an extensive treatment which actually can be avoided by early and adequate treatment of the disease.

Mass media such as pamphlets, newspaper, radio and television as discussed in a previous section may also be applied to dental health education. Mass media convey simple facts fairly well but their impersonal nature is a large disadvantage. Since dental health is on a low public acceptance scale people must be strongly motivated to get things done in the field of dentistry, for dental illness is only seldom a cause of death. Pamphlets booklets and leaflets, however, can serve as basic and general documents for dental health educators such as teachers, parents, doctors dentists and auxiliary personnel. They must then contain current and correct information for the class of reader for which they are designed. Particularly teachers should

be provided with detailed information so that they are able to answer the questions they are asked.

Dental health weeks may be held during the annual activities of the dental association. It is a good idea to organise during this time dental health exhibitions lectures and panel discussions. It is at the same time a good opportunity to place dentistry in the news spotlight of the community.

The major role in educating the people in dental health matters is played by the dentist. He has the opportunity to give personal advice on the ways of applying most efficiently methods which will result in the achievement of a high level of dental health. Government bodies and voluntary agencies must co-operate to try to supplement each other in the field of dental health education in order to attain a fruitful effect to the benefit of the individual, the community, and the dental profession. Much educational work can be done by the dentifrice and toothbrush industry as their advertising campaigns promote not only the use of their products but motivate the public to practice dental health principles as well. The dental profession should realise that if the application of preventive measures are not encouraged no improvement in dental health can be expected. It is therefore the task of every dentist as professional people to make greater efforts in the field of preventive dentistry, whereby dental health education may be considered as the major component.

S U M M A R Y.

1. Before a health or dental health education campaign can be started a thorough knowledge is required about the beliefs and attitudes that people already have concerning health and dental health and the causes of illness and dental diseases.

2. The aim of health education and dental health education it to motivate the people to do those things which will result in better health and better dental health. Health education, however, is only one of the factors in improving health and should therefore be integrated with other social, economic and educational efforts.

3. In order to obtain a high degree of effectiveness, the procedures employed in health and dental health education should take into consideration the processes by which people acquire knowledge, change their feelings and behaviour, and the factors that influence such changes.

4. In the field of health and dental health education two methods of education may be employed. The two-way or Socratic method is based on the interchange of knowledge between two or more people which can be carried out by medical or dental personnel. This system should be preferred whenever it is possible. The one-way or didactic method is based on the direct instruction by means of lectures, films, radio, television, leaflets, booklets, posters and newspapers.

5. Teacher's attitudes towards health and dental health matters exert a considerable effect directly on children and indirectly through these children on the community. It is therefore necessary to persuade state and governmental educational authorities to incorporate health and dental health teaching in the curriculum of the teacher training.

6. Much attention must be paid to the instruction of dental students in all fields of prevention in dentistry including dental health education.

7. Controlled fluoridation of drinking water hs proved to be a practicable, reliable and effective public health measure. Acceptance of this measure will depend on the knowledge and attitudes that prevail in a community.

C O N C L U S I O N S.

1. Principles and technique in health education are fully applicable to dental health education.

2. There is evidence that health and dental health education can be effective in preventive medicine and preventive dentistry, particularly in the prevention of periodontal disease.

3. No other vehicles or techniques for the prophylactic use of fluorides can at present effectively be used as a substitute for the fluoridation of drinking water. Dental health education could have as a major objective community acceptance of fluoridation.

4. More attention must be paid to the teaching of the technique of dental health education to students in dentistry.

5. More research in the field of preventive dentistry and dental health education is needed in order to find new procedures or to improve existing ones for the purpose of reducing the need for dental treatment.

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